Attorney: Art Hasan

Docket No.: 42055/SAH/K415

Inventor(s): Philip J. Kellman, Ph.D

Title: SYSTEM AND METHOD FOR
ADAPTIVE LEARNING
Sheet 1 of 12

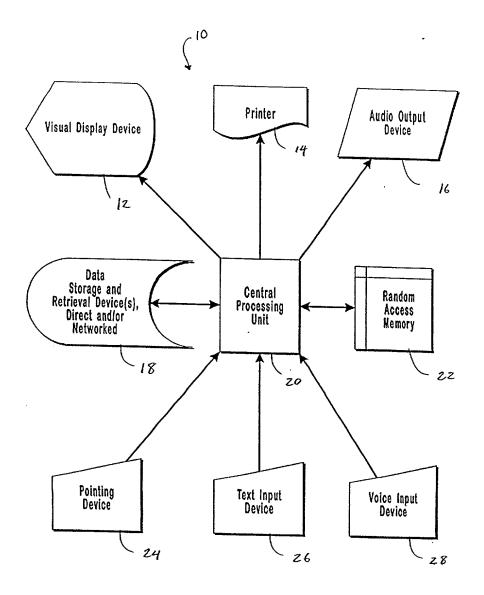


FIG. 1

Attorney: Docket No.: Art Hasan 42055/SAH/K415 Inventor(s): 42099/9A/7/419
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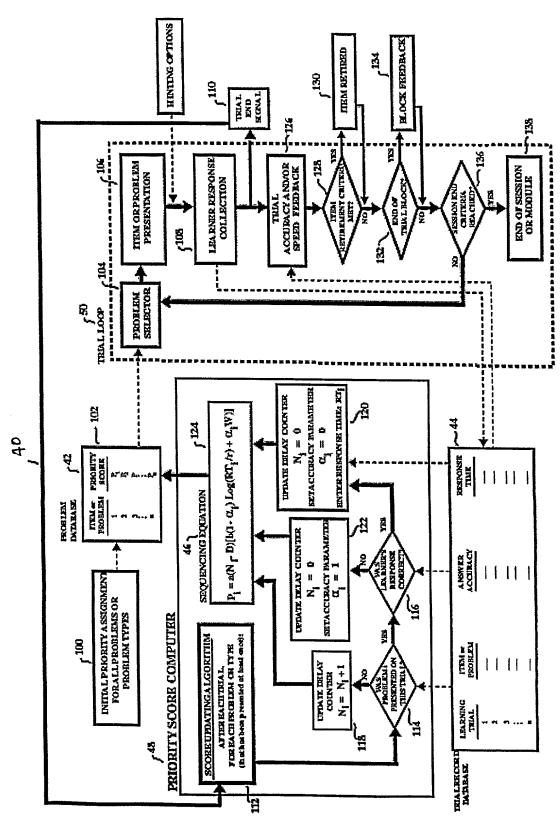


FIGURE 2. OPTIMAL SEQUENCING METHOD

RESPONSE

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Recurrence of problem enswered slowly on Trial 3. Recurrence of problem answered quickly on Trial 1. Recurrence of problem answered slowly on Trial 5. Recurrence of problem answered slowly on Trial 7. Recurrence of problem missed on Trial 2. Recurrence of problem missed on Trial 4. Recurrence of problem missed on Trial 12. Recurrence of problem missed on Trial 14. Recurrence of problem missed on Trial 9. Recurrence of Trial 10 problem. Fast, correct response. Incorrect response. Cornect but slow. TIME (sec) COMMENT 10.4 6.1 **5**Q ** 6.2 ACCURACY CORRECT CORRECT CORRECT CORRECT CORRECT CORRECT CORRECT WRONG WRONG WRONG CORRECT CORRECT CORRECT CORRECT WRONG CORRECT CORRECT CORRECT WRONG WRONG PROBLEM RESPONSE 28 72. 42. 77 **‡** .04 .08 28 "74" .181. 7127 :81 32 \$ 742 Ŝ 30. 188 7X7= 12 X 7= 6X7==6X6 12 X 7= 5 X 8= =6 X 6 7 X 4= 6X3= =6X6 6X7 = .3 X 4= $=6 \times 6$ 7X7= 12 X 7= 6X7 = -3 X 10= TRIAL 12 13 14 15 16 17 17 17 18 19 20 10 11

Figure 3. Sample Sequence of Trials Using the Sequencing Algorithm. Relevant parameter values: a=.1, b=2, D=2, W=12, K=1.

Arrows indicate selected examples of problem recurrence. (See faxt.)

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91		٥	516			124	530	205	1	1	1	-	-	-	-	
15		-1.2				40	424		-	-	1	-	-	-	-	
4 .			258	8	0	42				1	1	1	-	-	-	
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	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 10 11 12 13 14 15 16 17 18 19 17 13 13 14 15 15 1228 17 13 13 13 13 13 13 13 13 13 13 13 13 13	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 10 10 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 19 10 10 0.088 1.708 284 352 44 528 6.16 7.04 792 88 0.06 1.05 (1.14) 0.778 1.151 228	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 10 0.088 0 0.088 177 284 352 44 528 616 704 792 83 0.06 1.05 (1.4) 0.78 151 228 1 1 1 1 1 2 0 (12)-143 0 148 206 444 502 74 883 (1.04)-1.2 0 12 (2.4) 11 1 1 1 1 1 1 1 1 0 202 404 508 (1.01)-120 0 120 258 337 516 646 774 503 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 10 0.088 0 0.088 1776 284 352 44 528 616 704 792 83 0.06 1.05 (1.4) 0.78 1.51 228 11 (1) 1.12 0 (1.2) 1.148 0 1.148 206 444 502 74 888 (1.04) 1.12 0 12 (2.4) 1.11 11 (1) 1.2 0 202 404 508 (1.01) 1.12 0 1.12 258 337 516 645 774 503 11 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 1 0 088 .176 284 352 44 528 516 .704 792 83 0.06 1.05 (1.44) 078 .151 226 1 1 1 1 1 2 0 (12)143 0 .148 206 444 502 .74 883 (1.04)-1.2 0 12 (2.4) .11 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 D 1 0.088 0 088 .176 284 352 44 528 616 .704 702 83 006 1.06 (1.14) .078 .151 228 1 1 1 1 1 2 2 0 202 404 506 408 (1.01) .120 0 .120 258 307 516 646 .774 503 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 19 10 1	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 D 1 0.088 0 088 .176 284 352 44 528 616 .704 702 83 006 1.06 (1.4) .078 .151 228 1 1 1 1 1 2 2 0 202 404 508 (0.0) .120 0 .120 258 307 516 646 .774 503 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 19 10 11 1	1	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 19 19 11 12 13 14 15 16 17 18 19 19 19 19 19 19 19 19 19 19 19 19 19	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 15 12 15 15 15 15 15 15	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 18 18 19 10 11 12 13 14 15 16 17 18 19 19 10 10 0.028	1

Excure 4. Priority Scores by Trial for Sample Segrence in Figure 3. Columns indicate triak; rows show a partial list of problems in the database. Circled priority scores indicate the problem chosen by the algorithm for that trial Parameter values: a = .1; b=2; W=12; D=2; k=1; r=2.

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RESPUNSE

	RESPONSE												
TRIAL	PROBLEM	RESPONSE	ACCURACY	TIME (see	COMMENT								
1	camino	"road"	CORRECT	3.5	Fast, correct response.								
2	Martes	"March"	WRONG	••	Incorrect response.								
3	dos	"two"	CORRECT	18.4	Correct but slow.								
4	verde	"Don't know"	WRONG										
5	anaranjado	"angel"	WRONG										
6	Martes	"Toesday"	CORRECT	15.0	Recurrence of problem missed o								
7	Abril	"April"	CORRECT	10.4	reconstructed problem missed (
8	facil	"easy"	CORRECT	2.6									
9	verde	"green"	CORRECT	9.7	Recurrence of problem missed o								
10	anaranjado	"apple"	WRONG		Recurrence of problem missed o								
11	Viernes	"Friday"	CORRECT	4.8	tende of problem missed ()								
12	azul	"blue"	WRONG										
13	dos	"fwo"	CORRECT	2.4	Recurrence of problem answered								
14	Noviembre	"November"	CORRECT	8.6	provide di provide di ancie								
15	anaranjado	"orange"	CORRECT	11.3	Recurrence of problem missed o								
16	cero	"zem"	CORRECT	2.7	or problem missed (
17	camino	"road"	CORRECT	6.2	Recurrence of problem answere								
18	Martes	"Tuesday"	CORRECT	5.1	Recurrence of problem answere								
19	hija	"daughter"	CORRECT	3.2	Probein and neter								
20	empujar	"orange"	WRONG	Ka									

Figure 5. Sample Sequence of Trials Using the Sequencing Algorithm with Parameters Set to Favor Introduction of Relevant parameter values: a=.1, b=1.5, D=2, r=2, W=6, K=1.2

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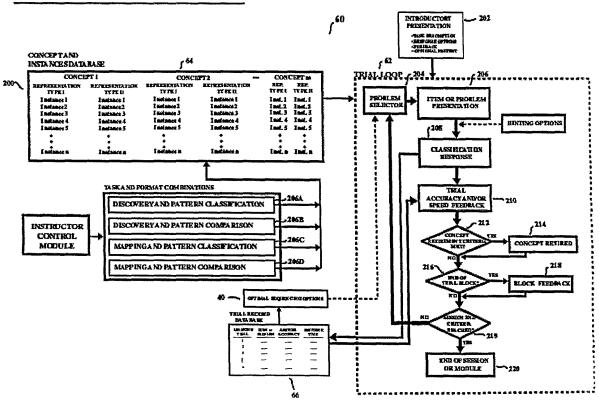
TRIAL

TRIAL																			
1	2	3	4	5	6	7	8	9	10	11	12	1.3	14	15	16	17	18	19	20
	69	0	.09	.18	.27	.37	.46	.55	.64	.73	.82	.92	1.01	1.1	1.19	(2)	09	6	.09
1.2	(12)	-0.6	0	0.6	(1)	-0.14	0	.14	.28	.42	.56	.70	.84	.98	1.11	1.25	(39)	~08	0
1.2	1.2	<u>(1</u>)	0.16	0	.16	.32	.49	.65	.81	.97	1.13	(I)	12	0	.12	.25	.37	.49	.61
1.2	1.2	1.2	(2)	-0.6	o	.6	1.2	(8)	-0.12	0	0.12	.23	.345	.46	.58	.69	.81	.92	1.04
1.2	1.2	1.2	1.2	12	-0,6	0	.6	1.2	(3)	-0.6	0	.6	1.2	(1.8)	12	0	.12	.25	.37
1.2	1.2	1.2	1.2	1.2	1.2	(12)	08	0	.08	.17	.25	.34	.42	.51	.59	.68	.76	.85	.93
1.2	1.2	1.2	1.2	1.2	1.2	1.2	12	09	0	.09	.18	.27	.37	.46	.55	.64	.73	.82	.92
1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	12	-0.16	Ð	.16	.33	.49	.66	.82	.99	1.15
1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	(1.2)	07	0	.07	.13	.20	.26	.33	.40
1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	(1.2)	-0.11	0	.11	.22	.33	.44
1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	12	09	9	.09	.19
1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	(1.2)	-0.6
1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	(1.2)
1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
	1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2	1.2 09 1.2 1.2	1.2 1.2	(1.2) 09 0 .09 1.2 (1.2) -0.6 0 1.2 1.2 (1.2) -0.16 1.2 1.2 1.2 (1.2) 1.2 1.2 1.2 1.2 1.2 1.2	(12) 09 0 .09 .18 1.2 (1.2) -0.6 0 0.6 1.2 1.2 (1.2) -0.16 0 1.2 1.2 1.2 (1.2) -0.6 1.2 1.2 1.2 1.2 -0.6 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1	(12) 09 0 .09 .18 .27 1.2 (1.2) -0.6 0 0.6 (1.2) 1.2 1.2 (1.2) -0.6 0 .16 1.2 1.2 (1.2) -0.6 0 0 1.2 1.2 1.2 1.2 -0.6 0 1.2 1.2 1.2 1.2 1.2 -0.6 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 <td< td=""><td>(12) 09 0 .09 .18 .27 .37 1.2 (1.2) -0.6 0 0.6 (1.2) -0.14 1.2 1.2 (1.2) -0.16 0 .16 .32 1.2 1.2 1.2 (1.2) -0.6 0 .6 1.2 1.2 1.2 1.2 1.2 1.2 (1.2) 1.2 1.2 1.2 1.2 1.2 1.2 (1.2) 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2</td><td>(12) 09 0 .09 .18 .27 .37 .46 1.2 (1.2) -0.6 0 0.6 (1.2) -0.14 0 1.2 1.2 (1.2) -0.16 0 .16 .32 .49 1.2 1.2 1.2 (1.2) -0.6 0 .6 1.2 1.2 1.2 1.2 1.2 1.2 -0.6 0 .6 1.2 1.2 1.2 1.2 1.2 1.2 -0.8 6 1.2 1.2 1.2 1.2 1.2 1.2 -0.8 6 6 .6 1.2 1.2 1.2 1.2 1.2 1.2 1.2 .08 1.2 1.</td><td>1 2 3 4 5 6 7 8 9 (12) 09 0 .09 .18 .27 .37 .46 .55 1.2 (1.2) -0.6 0 .62 -0.14 0 .14 1.2 (1.2) -0.16 0 .16 .32 .49 .65 1.2 1.2 1.2 -0.6 0 .6 1.2 (38) 1.2 1.2 1.2 1.2 -0.6 0 .6 1.2 (38) 1.2 1.2 1.2 1.2 1.2 -0.6 0 .6 1.2 (38) 1.2 1.2 1.2 1.2 1.2 1.2 1.2 0 6 1.2 0 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2<!--</td--><td>1 2 3 4 5 6 7 8 9 10 (12) .09 0 .09 .18 .27 .37 .46 .55 .64 1.2 (12) 0.6 0 .66 (12) 0.14 .28 1.2 1.2 (1.2) 0.16 0 .16 .32 .49 .65 .81 1.2 1.2 1.2 0.2 0.6 0 .6 1.2 (18) 0.12 1.2 1.2 1.2 0.2 0.6 0 .6 1.2 (18) 0.12 1.2 1.2 1.2 1.2 1.2 0.6 0 .6 1.2 (18) 0.08 1.2 1.2 1.2 1.2 1.2 1.2 0.08 0 .08 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2<!--</td--><td>1 2 3 4 5 6 7 8 9 10 11 (12) 09 0 .09 .18 .27 .37 .46 .55 .64 .73 1.2 (1.2) -0.6 0 .62 (1.2) -0.14 0 .14 .28 .42 1.2 1.2 (1.2) -0.16 0 .16 .32 .49 .65 .81 .97 1.2 1.2 1.2 (1.2) -0.6 0 .6 1.2 (1.8) -0.12 0 1.2 1.2 1.2 1.2 1.2 1.2 1.2 (1.2) 0 .6 1.2 (1.8) -0.6 1.2 1.2 1.2 1.2 1.2 1.2 1.2 0 .08 .17 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 0 .09 .08 .17</td><td>1 2 3 4 5 6 7 8 9 10 11 12 (12) .09 0 .09 .18 .27 .37 .46 .55 .64 .73 .82 1.2 (12) -0.6 0 .66 (12) -0.14 0 .14 .28 .42 .56 1.2 1.2 (1.2) -0.16 0 .16 .32 .49 .65 .81 .97 1.13 1.2 1.2 1.2 (1.2) -0.6 0 .6 1.2 (18) -0.12 0 -0.12 1.2 1.2 1.2 1.2 0.6 0 .6 1.2 (18) -0.6 0 1.2 1.2 1.2 1.2 1.2 1.2 0.0 .08 .17 .25 1.2 1.2 1.2 1.2 1.2 1.2 0.0 .09 .18 <th< td=""><td>1 2 3 4 5 6 7 8 9 10 11 12 13 (12) 09 0 .09 .18 .27 .37 .46 .55 .64 .73 .82 .92 1.2 (1.2) -0.6 0 .66 (1.2) -0.14 0 .14 .28 .42 .56 .70 1.2 1.2 (1.2) -0.16 0 .16 .32 .49 .65 .81 .97 1.13 (.3) 1.2 1.2 1.2 0.6 0 .6 1.2 (1.8) -0.6 0 .61 1.2 (1.8) -0.6 0 .6 1.2 (1.8) -0.6 0 .6 1.2 (1.8) -0.6 0 .6 1.2 (1.8) -0.6 0 .6 1.2 1.2 1.2 1.2 1.2 1.2 0.2 0 .08 .17</td><td>1 2 3 4 5 6 7 8 9 10 11 12 13 14 (12) 09 0 .09 .18 .27 .37 .46 .55 .64 .73 .82 .92 1.01 1.2 (1.2) -0.6 0 0.6 (1.2) -0.14 0 .14 .28 .42 .56 .70 .84 1.2 1.2 (1.2) 0.16 0 .16 .32 .49 .65 .81 .97 1.13 (.3 .12 1.2 1.2 1.2 0.0 0 .6 1.2 (1.8) -0.6 0 .61 1.2 (1.8) -0.6 0 .61 1.2 (1.8) -0.6 0 .61 1.2 (1.8) -0.6 0 .61 1.2 (1.8) -0.6 0 .61 1.2 (1.8) -0.6 0 .61 1.2</td><td>1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 (12) 09 0 .09 .18 .27 .37 .46 .55 .64 .73 .82 .92 1.01 1.1 1.2 (12) 0.6 0 .66 (12) 0.14 0 .14 .28 .42 .56 .70 .84 .98 1.2 1.2 (1.2) 0.16 0 .16 .32 .49 .65 .81 .97 1.13 (1.3) .12 0 1.2 1.2 1.2 0.6 0 .6 1.2 (1.8) 0.12 0 0.12 .23 .345 .46 1.2 1.2 1.2 1.2 0.2 0.8 0 .08 1.7 .25 .34 .42 .51 1.2 1.2 1.2 1.2 0.0 .</td><td>1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 (12) -09 0 0 09 .18 .27 .37 .46 .55 .64 .73 .82 .92 1.01 1.1 1.19 1.2 (1.2) -0.6 0 0 0.6 (1.2) -0.14 0 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09 0 .09 .18 .27 .37 .46 .55 1.2 (1.2) -0.6 0 .62 -0.14 0 .14 1.2 (1.2) -0.16 0 .16 .32 .49 .65 1.2 1.2 1.2 -0.6 0 .6 1.2 (38) 1.2 1.2 1.2 1.2 -0.6 0 .6 1.2 (38) 1.2 1.2 1.2 1.2 1.2 -0.6 0 .6 1.2 (38) 1.2 1.2 1.2 1.2 1.2 1.2 1.2 0 6 1.2 0 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 </td <td>1 2 3 4 5 6 7 8 9 10 (12) .09 0 .09 .18 .27 .37 .46 .55 .64 1.2 (12) 0.6 0 .66 (12) 0.14 .28 1.2 1.2 (1.2) 0.16 0 .16 .32 .49 .65 .81 1.2 1.2 1.2 0.2 0.6 0 .6 1.2 (18) 0.12 1.2 1.2 1.2 0.2 0.6 0 .6 1.2 (18) 0.12 1.2 1.2 1.2 1.2 1.2 0.6 0 .6 1.2 (18) 0.08 1.2 1.2 1.2 1.2 1.2 1.2 0.08 0 .08 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2<!--</td--><td>1 2 3 4 5 6 7 8 9 10 11 (12) 09 0 .09 .18 .27 .37 .46 .55 .64 .73 1.2 (1.2) -0.6 0 .62 (1.2) -0.14 0 .14 .28 .42 1.2 1.2 (1.2) -0.16 0 .16 .32 .49 .65 .81 .97 1.2 1.2 1.2 (1.2) -0.6 0 .6 1.2 (1.8) -0.12 0 1.2 1.2 1.2 1.2 1.2 1.2 1.2 (1.2) 0 .6 1.2 (1.8) -0.6 1.2 1.2 1.2 1.2 1.2 1.2 1.2 0 .08 .17 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 0 .09 .08 .17</td><td>1 2 3 4 5 6 7 8 9 10 11 12 (12) .09 0 .09 .18 .27 .37 .46 .55 .64 .73 .82 1.2 (12) -0.6 0 .66 (12) -0.14 0 .14 .28 .42 .56 1.2 1.2 (1.2) -0.16 0 .16 .32 .49 .65 .81 .97 1.13 1.2 1.2 1.2 (1.2) -0.6 0 .6 1.2 (18) -0.12 0 -0.12 1.2 1.2 1.2 1.2 0.6 0 .6 1.2 (18) -0.6 0 1.2 1.2 1.2 1.2 1.2 1.2 0.0 .08 .17 .25 1.2 1.2 1.2 1.2 1.2 1.2 0.0 .09 .18 <th< td=""><td>1 2 3 4 5 6 7 8 9 10 11 12 13 (12) 09 0 .09 .18 .27 .37 .46 .55 .64 .73 .82 .92 1.2 (1.2) -0.6 0 .66 (1.2) -0.14 0 .14 .28 .42 .56 .70 1.2 1.2 (1.2) -0.16 0 .16 .32 .49 .65 .81 .97 1.13 (.3) 1.2 1.2 1.2 0.6 0 .6 1.2 (1.8) -0.6 0 .61 1.2 (1.8) -0.6 0 .6 1.2 (1.8) -0.6 0 .6 1.2 (1.8) -0.6 0 .6 1.2 (1.8) -0.6 0 .6 1.2 1.2 1.2 1.2 1.2 1.2 0.2 0 .08 .17</td><td>1 2 3 4 5 6 7 8 9 10 11 12 13 14 (12) 09 0 .09 .18 .27 .37 .46 .55 .64 .73 .82 .92 1.01 1.2 (1.2) -0.6 0 0.6 (1.2) -0.14 0 .14 .28 .42 .56 .70 .84 1.2 1.2 (1.2) 0.16 0 .16 .32 .49 .65 .81 .97 1.13 (.3 .12 1.2 1.2 1.2 0.0 0 .6 1.2 (1.8) -0.6 0 .61 1.2 (1.8) -0.6 0 .61 1.2 (1.8) -0.6 0 .61 1.2 (1.8) -0.6 0 .61 1.2 (1.8) -0.6 0 .61 1.2 (1.8) -0.6 0 .61 1.2</td><td>1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 (12) 09 0 .09 .18 .27 .37 .46 .55 .64 .73 .82 .92 1.01 1.1 1.2 (12) 0.6 0 .66 (12) 0.14 0 .14 .28 .42 .56 .70 .84 .98 1.2 1.2 (1.2) 0.16 0 .16 .32 .49 .65 .81 .97 1.13 (1.3) .12 0 1.2 1.2 1.2 0.6 0 .6 1.2 (1.8) 0.12 0 0.12 .23 .345 .46 1.2 1.2 1.2 1.2 0.2 0.8 0 .08 1.7 .25 .34 .42 .51 1.2 1.2 1.2 1.2 0.0 .</td><td>1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 (12) -09 0 0 09 .18 .27 .37 .46 .55 .64 .73 .82 .92 1.01 1.1 1.19 1.2 (1.2) -0.6 0 0 0.6 (1.2) -0.14 0 .14 .28 .42 .56 .70 .84 .98 1.11 1.2 1.2 (1.2) -0.16 0 .16 .32 .49 .65 .81 .97 1.13 (1.3) .12 0 .12 1.2 1.2 1.2 (1.2) -0.6 0 .6 1.2 (1.8) -0.12 0 .012 .23 .345 .46 .58 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2</td><td>$\begin{array}{cccccccccccccccccccccccccccccccccccc$</td><td>$\begin{array}{c ccccccccccccccccccccccccccccccccccc$</td><td>$\begin{array}{c 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0.6 0 .6 1.2 (18) -0.6 0 1.2 1.2 1.2 1.2 1.2 1.2 0.0 .08 .17 .25 1.2 1.2 1.2 1.2 1.2 1.2 0.0 .09 .18 <th< td=""><td>1 2 3 4 5 6 7 8 9 10 11 12 13 (12) 09 0 .09 .18 .27 .37 .46 .55 .64 .73 .82 .92 1.2 (1.2) -0.6 0 .66 (1.2) -0.14 0 .14 .28 .42 .56 .70 1.2 1.2 (1.2) -0.16 0 .16 .32 .49 .65 .81 .97 1.13 (.3) 1.2 1.2 1.2 0.6 0 .6 1.2 (1.8) -0.6 0 .61 1.2 (1.8) -0.6 0 .6 1.2 (1.8) -0.6 0 .6 1.2 (1.8) -0.6 0 .6 1.2 (1.8) -0.6 0 .6 1.2 1.2 1.2 1.2 1.2 1.2 0.2 0 .08 .17</td><td>1 2 3 4 5 6 7 8 9 10 11 12 13 14 (12) 09 0 .09 .18 .27 .37 .46 .55 .64 .73 .82 .92 1.01 1.2 (1.2) -0.6 0 0.6 (1.2) -0.14 0 .14 .28 .42 .56 .70 .84 1.2 1.2 (1.2) 0.16 0 .16 .32 .49 .65 .81 .97 1.13 (.3 .12 1.2 1.2 1.2 0.0 0 .6 1.2 (1.8) -0.6 0 .61 1.2 (1.8) -0.6 0 .61 1.2 (1.8) -0.6 0 .61 1.2 (1.8) -0.6 0 .61 1.2 (1.8) -0.6 0 .61 1.2 (1.8) -0.6 0 .61 1.2</td><td>1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 (12) 09 0 .09 .18 .27 .37 .46 .55 .64 .73 .82 .92 1.01 1.1 1.2 (12) 0.6 0 .66 (12) 0.14 0 .14 .28 .42 .56 .70 .84 .98 1.2 1.2 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1.2 1.2 1.2 1.2 1.2 1.2 1.2 0 .08 .17 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 0 .09 .08 .17	1 2 3 4 5 6 7 8 9 10 11 12 (12) .09 0 .09 .18 .27 .37 .46 .55 .64 .73 .82 1.2 (12) -0.6 0 .66 (12) -0.14 0 .14 .28 .42 .56 1.2 1.2 (1.2) -0.16 0 .16 .32 .49 .65 .81 .97 1.13 1.2 1.2 1.2 (1.2) -0.6 0 .6 1.2 (18) -0.12 0 -0.12 1.2 1.2 1.2 1.2 0.6 0 .6 1.2 (18) -0.6 0 1.2 1.2 1.2 1.2 1.2 1.2 0.0 .08 .17 .25 1.2 1.2 1.2 1.2 1.2 1.2 0.0 .09 .18 <th< td=""><td>1 2 3 4 5 6 7 8 9 10 11 12 13 (12) 09 0 .09 .18 .27 .37 .46 .55 .64 .73 .82 .92 1.2 (1.2) -0.6 0 .66 (1.2) -0.14 0 .14 .28 .42 .56 .70 1.2 1.2 (1.2) -0.16 0 .16 .32 .49 .65 .81 .97 1.13 (.3) 1.2 1.2 1.2 0.6 0 .6 1.2 (1.8) -0.6 0 .61 1.2 (1.8) -0.6 0 .6 1.2 (1.8) -0.6 0 .6 1.2 (1.8) -0.6 0 .6 1.2 (1.8) -0.6 0 .6 1.2 1.2 1.2 1.2 1.2 1.2 0.2 0 .08 .17</td><td>1 2 3 4 5 6 7 8 9 10 11 12 13 14 (12) 09 0 .09 .18 .27 .37 .46 .55 .64 .73 .82 .92 1.01 1.2 (1.2) -0.6 0 0.6 (1.2) -0.14 0 .14 .28 .42 .56 .70 .84 1.2 1.2 (1.2) 0.16 0 .16 .32 .49 .65 .81 .97 1.13 (.3 .12 1.2 1.2 1.2 0.0 0 .6 1.2 (1.8) -0.6 0 .61 1.2 (1.8) -0.6 0 .61 1.2 (1.8) -0.6 0 .61 1.2 (1.8) -0.6 0 .61 1.2 (1.8) -0.6 0 .61 1.2 (1.8) -0.6 0 .61 1.2</td><td>1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 (12) 09 0 .09 .18 .27 .37 .46 .55 .64 .73 .82 .92 1.01 1.1 1.2 (12) 0.6 0 .66 (12) 0.14 0 .14 .28 .42 .56 .70 .84 .98 1.2 1.2 (1.2) 0.16 0 .16 .32 .49 .65 .81 .97 1.13 (1.3) .12 0 1.2 1.2 1.2 0.6 0 .6 1.2 (1.8) 0.12 0 0.12 .23 .345 .46 1.2 1.2 1.2 1.2 0.2 0.8 0 .08 1.7 .25 .34 .42 .51 1.2 1.2 1.2 1.2 0.0 .</td><td>1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 (12) -09 0 0 09 .18 .27 .37 .46 .55 .64 .73 .82 .92 1.01 1.1 1.19 1.2 (1.2) -0.6 0 0 0.6 (1.2) -0.14 0 .14 .28 .42 .56 .70 .84 .98 1.11 1.2 1.2 (1.2) -0.16 0 .16 .32 .49 .65 .81 .97 1.13 (1.3) .12 0 .12 1.2 1.2 1.2 (1.2) -0.6 0 .6 1.2 (1.8) -0.12 0 .012 .23 .345 .46 .58 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2</td><td>$\begin{array}{cccccccccccccccccccccccccccccccccccc$</td><td>$\begin{array}{c 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.49 .65 .81 .97 1.13 (1.3) .12 0 1.2 1.2 1.2 0.6 0 .6 1.2 (1.8) 0.12 0 0.12 .23 .345 .46 1.2 1.2 1.2 1.2 0.2 0.8 0 .08 1.7 .25 .34 .42 .51 1.2 1.2 1.2 1.2 0.0 .	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 (12) -09 0 0 09 .18 .27 .37 .46 .55 .64 .73 .82 .92 1.01 1.1 1.19 1.2 (1.2) -0.6 0 0 0.6 (1.2) -0.14 0 .14 .28 .42 .56 .70 .84 .98 1.11 1.2 1.2 (1.2) -0.16 0 .16 .32 .49 .65 .81 .97 1.13 (1.3) .12 0 .12 1.2 1.2 1.2 (1.2) -0.6 0 .6 1.2 (1.8) -0.12 0 .012 .23 .345 .46 .58 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$

FIGURE 6. Priority Scores by Trial for Sample Sequence in Figure 5. Columns indicate trials; rows show a partial list of problems in the database. Circled priority scores indicate the problem chosen by the algorithm for that trial. Parameter values: a = .1; b=1.5; W=6; D=2; k=1.2; r=2.

Attorney: Art Hasan
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Inventor(s): Philip J Kellman, Ph D.
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FIGURE 7. PERCEPTUAL LEARNING MODULE

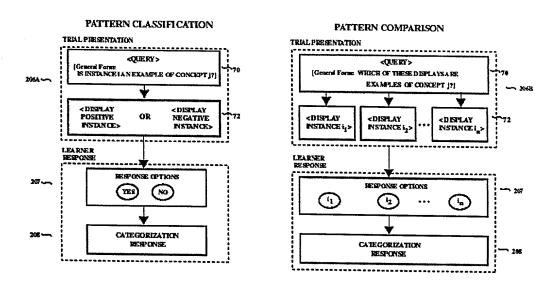


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FIGURE 8. PERCEPTUAL LEARNING SYSTEM: STRUCTURE DISCOVERY VARIANT

PROBLEM PRESENTATION FORMATS - DETAIL



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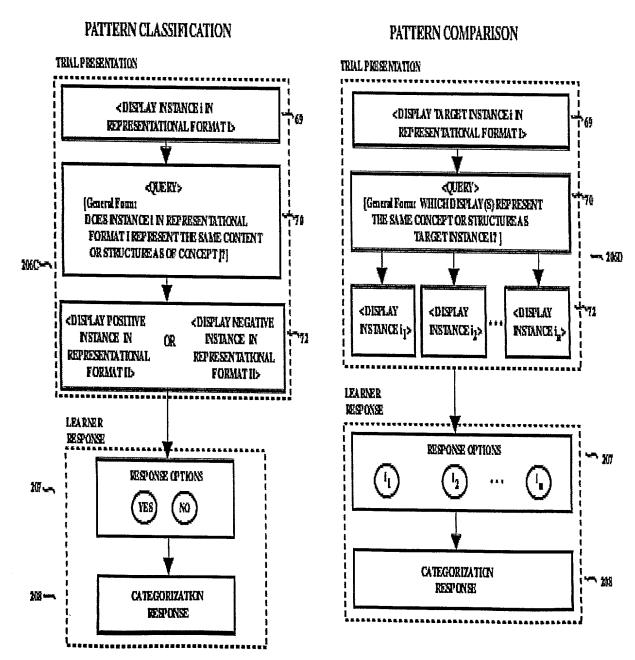
Inventor(s): Philip J Kellman, Ph.D

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FIGURE 9. PERCEPTUAL LEARNING SYSTEM: STRUCTURE MAPPING VARIANT

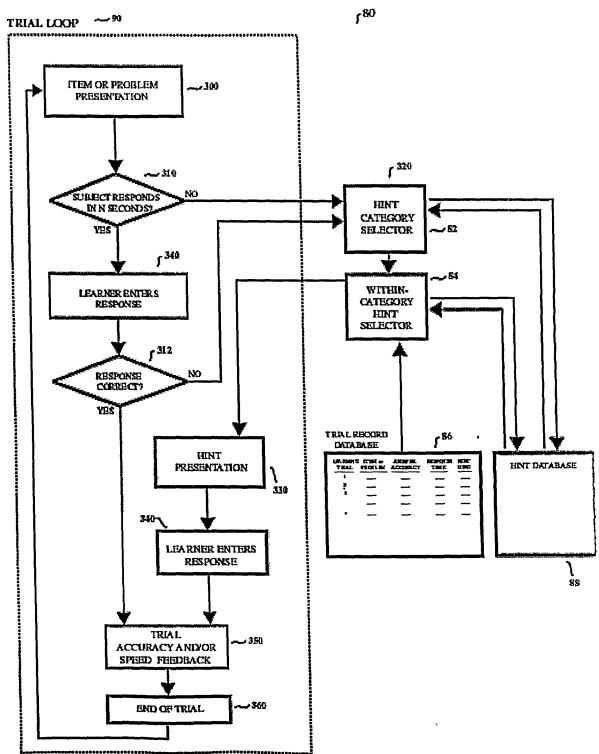
PROBLEM PRESENTATION FORMATS - DETAIL



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Title: SYSTEM AND METHOD FOR ADAPTIVE LEARNING Sheet 10 of 12

FIGURE 10

MINTING ALGORITHM: OVERVIEW



400,

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82 HINT CATEGORY SELECTOR INITIAL CATEGORY PRIORITY SCORE ASSIGNMENT YI (CR = 1) HINT DATABASE for PROBLEM OR CONCEPT J (All cutegory priorities are laidely set to 1.) CATEGORY PRIORITY SCORES 466 CATEGORY SCORE PRIORITY UPDATER CP₁ CP_2 CP₃ CPI CATEGORY 1 CATEGORY 2 CATEGORY 3 AFTEREACH TRIAL. m ck FOR EACH PROBLEM OR THE HINTS HINTS HINTS CP_{j=1} YES HENT CATEGORY USED OXLAST TRIAL! NO WEIGHTED RANDOM SELECTOR HINT REQUEST WEIGHTED RANDOM WITHIN CATEGORY HINT SELECTOR SELECTION OF HINT (FROM TRIAL LOOP) CATEGORY SUCH THAT: $p(C_i) = CP_i/CP_{total}$

FIGURE 11. HINT CATEGORY SELECTOR

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Inventor(s): Philip J. Kellman, Ph D
Title: SYSTEM AND METHOD FOR
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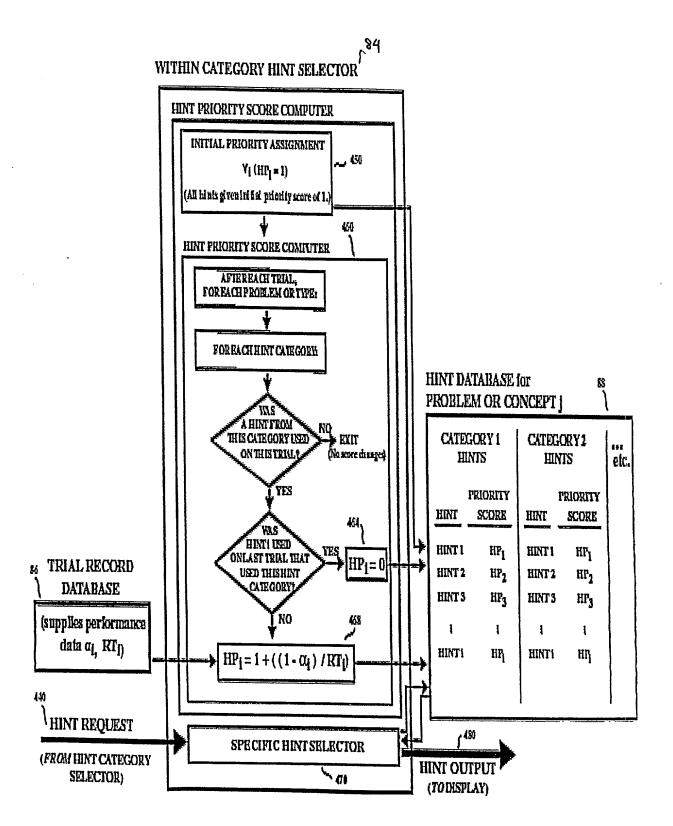


FIGURE 12 WITHIN-CATEGORY HINT SELECTOR

and the state of t